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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,709	12/27/2001	Migaku Takahashi	OSP-11676	9206
466	7590	03/23/2004	EXAMINER	
YOUNG & THOMPSON			BERNATZ, KEVIN M	
745 SOUTH 23RD STREET 2ND FLOOR			ART UNIT	
ARLINGTON, VA 22202			PAPER NUMBER	

1773

DATE MAILED: 03/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/026,709	Applicant(s) TAKAHASHI ET AL. eb	
	Examiner Kevin M Bernatz	Art Unit 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9,11,12,17 and 19-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,11,12,17 and 19-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>1/04</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Response to Amendment

1. Amendments to claims 1, 4, 5, 11, 12 and 21, filed on January 30, 2004, have been entered in the above-identified application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Request for Continued Examination

2. The Request for Continued Examination (RCE) under 37 CFR 1.53 (d) filed on January 30, 2004 is acceptable and a RCE has been established. An action on the RCE follows.

3. Claim 12 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The Examiner notes that the independent claim recites the ratio a/b being > 1.0 , i.e. the interatomic distance 'a' *being* larger than the interatomic distance 'b', hence claim 12 fails to further limit independent claim 1.

Claim Rejections - 35 USC § 102***Claim Rejections - 35 USC § 103***

4. Claims 1, 2, 4 – 9, 11, 12, 17 and 19 - 24 are rejected ***under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over*** Malhotra et al. ('217 B1) in view of the following evidentiary art: Ikeda et al. (IEEE Trans. Mag., 33(5), 1997, 3079 - 3081), Akimoto et al. ('736 A1), Bertero et al. ('567), Howard ('499) and Takahashi et al. ('847).

Regarding claims 1, 11, 12 and 21, Malhotra et al. disclose a magnetic recording medium comprising a non-magnetic base material (*Figure 1 – element 12*) and a ferromagnetic metal layer of a cobalt based alloy (*Element 16 and Table 1*) formed on top of said non-magnetic base material with a metal underlayer disposed between said base material and said ferromagnetic metal layer (*Elements 14 and 15*), wherein a coercive force H_c is at least 2000 Oe (*Table 1*), wherein said metal underlayer incorporates an underfilm of either one of Cr and a Cr alloy, and said Cr alloy also incorporates Mo and/or W (*col. 2, lines 8 – 12*).

Malhotra et al. fail to disclose the anisotropic magnetic field of the recording medium being at least 10,000 Oe at the same time the coercivity is at least 2000 Oe.

The Examiner notes that in the instant case the claimed and prior art products are substantially identical in both structure and composition (*e.g. Table 1 – $Co_{74}Cr_{17}Ta_4Pt_5$ alloy magnetic layer over $CrMo_{20}$ /Cr dual underlayer*). Therefore, in addition to the above disclosed limitations, the presently claimed property of “an anisotropic magnetic field H_k^{grain} is at least 10,000 Oe” is deemed to have inherently

Art Unit: 1773

been present because the claimed and prior art products are substantially identical in both structure and composition.

However, even in the case where the claimed anisotropic magnetic field may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the anisotropic field to a large value meeting applicants' claimed limitations in order to avoid write demagnetization (*as evidenced by Ikeda et al. – Sections III and IV and Figure 2*), to increase the coercivity (*as evidenced by Bertero et al. – col. 10, lines 21 – 24; col. 11, lines 28 – 32 where K_u is proportional to H_k ; and col. 20, line 60 bridging col. 21, line 11*) and/or to control the normalized coercive force (H_c/H_k^{grain}) in order to produce a low noise medium capable of high recording densities (*as evidenced by Takahashi et al. – col. 25, lines 9 – 13*).

Therefore, the Examiner deems that even in the case where the anisotropic magnetic field may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the anisotropic magnetic field through routine experimentation, especially given the knowledge in the art noted above regarding the effect of the anisotropic magnetic field on the write demagnetization properties, the transitional position of the magnetic layer and the noise of the recording medium. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding the limitations “wherein a lattice misfit ... is a value from 0.5% to 2.5%” and “an axial length ratio a/b ... is within a range from 1.002 to 1.008”, Malhotra

Art Unit: 1773

et al. disclose underlayers and ferromagnetic layers meeting applicants' claimed structural limitations (*Tables 1 and 2; Figures; and claims 1 and 9 – e.g. Table 1: Co-alloy magnetic layer over CrMo₂₀/Cr dual underlayer and Table 2: Co-alloy magnetic layer over CrTa₁₀/Cr dual underlayer*). Therefore, the Examiner deems that the above claimed limitations would have inherently been present in the prior art product since the claimed and prior art products are substantially-identical in structure as described above and there is no evidence of record that the prior art would not inherently possess the claimed limitations.

However, even in the case where the claimed crystalline lattice properties may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the crystalline lattice properties to values meeting applicants' claimed limitations in order to minimize lattice misfit (*as evidenced by Akimoto et al. – Paragraph 0079*) to improve the magnetic properties (*as evidenced by Bertero et al. – col. 4, lines 11 – 15, 40 – 44 and 59 – 67; col. 5, lines 5 – 9; col. 12, lines 48 – 57; col. 13, lines 50 – 59; col. 20, lines 36 – 41; col. 20, line 60 bridging col. 21, line 11; and Table 1*) including the squareness (*as evidenced by Howard – Figures 2A, 2B and 3; and col. 4, lines 3 – 6 and 41 - 55*).

Therefore, the Examiner deems that even in the case where the crystalline lattice properties may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the lattice misfit and axial length ratio through routine experimentation, especially given the knowledge in the art noted above

Art Unit: 1773

regarding the effect of the crystalline lattice properties on lattice misfit and the magnetic properties, including coercivity and squareness.

Regarding claim 2, the limitation “wherein said metal underlayer and said ferromagnetic metal layer are formed in a film fabrication chamber with an ultimate vacuum at a 10^{-9} Torr level, using a film fabrication gas with an impurity concentration of no more than 1 ppb” is a product-by-process limitation and is not further limiting in so far as the structure of the product is concerned. In the instant case, the claimed and prior art products are deemed substantially identical since both the claimed and prior art are substantially identical in both structure and composition (i.e. a Co-alloy magnetic layer over a $\text{CrMo}_{20}/\text{Cr}$ dual underlayer).

Regarding claims 4, 5, 7 – 9, 19, 20 and 22 - 24, Malhotra et al. disclose underlayers and ferromagnetic layers meeting applicants’ claimed structural limitations (*Tables 1 and 2; Figures; and claims 1 and 9*).

Regarding the limitations “with different lattice constants” in claim 6, the Examiner notes that the claimed and prior art products are substantially identical in both structure and composition (*Table 1: Co-alloy magnetic layer over $\text{CrMo}_{20}/\text{Cr}$ dual underlayer and Table 2: Co-alloy magnetic layer over $\text{CrTa}_{10}/\text{Cr}$ dual underlayer*) and, therefore, the Examiner deems that the above claimed limitations would have inherently been present in the prior art product for the reasons cited above. However, even in the case where the claimed crystalline lattice properties may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the crystalline lattice properties to values meeting applicants’ claimed

Art Unit: 1773

limitations in order to improve the magnetic properties (as evidenced by Bertero et al. – col. 4, lines 11 – 15, 40 – 44 and 59 – 67; col. 5, lines 5 – 9; col. 12, lines 48 – 57; col. 13, lines 50 – 59; col. 20, lines 36 – 41; col. 20, line 60 bridging col. 21, line 11; and Table 1) including the squareness (as evidenced by Howard – Figures 2A, 2B and 3; and col. 4, lines 3 – 6 and 41 – 55).

Therefore, the Examiner deems that even in the case where the crystalline lattice properties may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the relative lattice constants of the two underfilms through routine experimentation, especially given the knowledge in the art noted above regarding the effect of the crystalline lattice properties on lattice misfit and the magnetic properties, including coercivity and squareness.

Regarding claim 17, Malhotra et al. disclose apparatus elements meeting applicants' claimed limitations (col. 6, lines 1 – 8).

Response to Arguments

5. The rejection of claims 1, 2, 4 – 9, 11, 12, 17 and 19 – 24 under 35 U.S.C. § 102 (e) and/or 103(a) – Malhotra et al. in view of various evidentiary art

Applicant(s) argue(s) that applicants' examples provide sufficient evidence that the applied art would not inherently possess the claimed lattice misfit and axial length ratio a/b since applicants' examples demonstrate that "high coercivity H_c result when

Art Unit: 1773

both these conditions are satisfied" (*page 10 of response*). The examiner respectfully disagrees.

The Examiner notes that Malhotra et al. disclose their embodiments possessing "high coercivity", i.e. all their disclosed embodiments possess Hc values well above applicants' claimed 2000 Oe limit. As such, the Examiner deems that applicants' arguments *support* the position that the prior art product would necessarily meet the claimed limitations, since applicants' state that high coercivity (e.g. >2000 Oe claimed) only results when both the lattice mismatch and axial length ratio's are met and Malhotra et al. clearly disclose that their disclosed invention possesses coercivity values well over 2000 Oe (~3000 Oe in all examples). As such, the Examiner does not find applicants' arguments convincing.

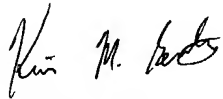
Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (571) 272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1773

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Bernatz
Patent Examiner

March 15, 2004